REMARKS

Claims 1, 2, 4, 6, 9-12, 14, 17, 19, 21-30 are pending. Claims 5 and 31-33 are cancelled herein without prejudice or disclaimer. Claims 1, 6, 10, 19 and 22 are amended herein. Claim 1 has been amended to include the subject matter of claims 5 and 31. Claim 10 has been amended to include the subject matter of claim 32. Claim 19 has been amended to include the subject matter of claim 33. Claim 22 has been amended in response to the rejection under 35 U.S.C. §112 and is detailed below. Claims 6 and 22 have also been amended to provide for proper antecedent basis.

Applicants' Response to the Claim Rejections under 35 U.S.C. §112(a)

Claim 22, is rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Specifically, the Office asserts that lines 2-3 which recites, "reduce the photosensitive resist material and the antireflection film" is not clear because it is not understood what is meant by to reduce the photosensitive resist material and the antireflection film.

In response thereto, applicants have amended the phrase by removing the language noted by the Office and clarifying that a whole thickness of the antireflection film is etched. As set forth on page 6, lines 3-4 of the specification, after the whole thickness of the organic antireflection film 5 is etched, over-etching is performed. Applicants respectfully submit that the claim language, as amended, is definite, and therefore, request favourable reconsideration.

Applicants' Response to the Claim Rejections under 35 U.S.C. §103(a)

Claims 1-2, 4-6, 9-12, 14, 17, 19, 21-22, and 31-33, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,579,808 (Cho et al., hereinafter referred to as Cho) in view of U.S. Patent No. 6,110,826 (Lou et al., hereinafter referred to as Lou).

Applicants respectfully traverse on at least the bases that the combination of Cho and Lou does not teach all aspects of the presently claimed invention, and there is no reason whereby one of skill in the art would derive the claimed invention based on the teachings of Cho and Lou.

First, in regard to parent claims 1, 10, 19 and dependent claims there from, applicants have included the features from prior dependent claims 5, and 31-33 respectively.

In amended claims 1, 10 and 19, the underlying surface (4) exposed after etching the antireflection film (5) (shown in Fig.1C) is larger than the surface of the antireflection film (5) after developing the photosensitive resist film (6) (shown in Fig.1A). In contrast, in the method of Cho, the area b2 (shown in Fig.3B) is smaller than the area a2 (shown in Fig.3A). Namely, the underlying surface (204) exposed after etching the antireflection film (207) (shown in Fig.3B) is smaller than the surface of the antireflection film (206) after developing the photosensitive resist film (208) (shown in Fig.3A). There is no teaching in Lou which would lead a skilled artisan to abandon this teaching of Cho so as to adopt the formation set forth in applicants' claims. Wherefore, the combination of references does not teach all the aspects of the claimed invention.

Further, in regard to parent claims 1, 10, 17, 19 and their respective dependent claims, applicants have argued that there is no reason for a skilled artisan to use the etch gas of Lou for the device of Cho. The Office appears to maintain that the basis for motivation is that the claimed etch gas is applied to Lou's etching step. See page 9 section 8.C. of the Office Action. However, there is no reason for one of skill in the art to use the etch gas of Lou for the device of Cho.

As shown in Fig. 3B of Cho, SO_2 gas and He gas are used when the anti-reflective coating layer 206 is etched. The anti-reflective coating layer 206 is made of organic material (column 3, lines 28-30). After the anti-reflective coating layer 206 is etched, the insulating layer (204, 205) is etched using C_4F_8, CH_2F_2 and Ar shown in Fig. 3C. The insulating layer (204, 205) is made of oxidized silicon (column 3, lines 26-28).

Lou's step described at column 6, lines 1-15 corresponds to the step of etching the IMD layer (300) and the etch-step layer (250). The IMD layer (300) is made of PSG or oxide formed by the deposition of TEOS (column 5, lines 56-64). The etch-stop layer (250) is made of silicon nitride (column 5, lines 50-51). Namely, both of the IMD (300) layer and the etch-stop layer (250) are made of inorganic material.

Lou's etching step for etching the IMD layer (300) and the etch-stop layer(250) corresponds to the etching step for etching the insulating layer (204, 205) made of inorganic material shown in Fig. 3C. As such, the gas and gas flow rate for etching the IMD layer (300) and the etch-stop layer (250) of Lou would need to be applied to the step for etching the insulating layer (205) of Cho shown in Fig. 3C. However, there is no reason for Lou's etching

gas and gas flow rate to be applied in the step for etching the anti-reflective coating layer (206, 207) made of organic material shown in Fig. 3B of Cho.

Further, the Office states that the claims recite exposing the resist pattern to a plasma of mixture gases i.e., SO_2, He, etc. See page 10, section 8.D. of the Office Action. However, amended claim 1 recites etching the antireflection film made of organic substance as well as exposing the resist pattern to the plasma of the mixture gasses. Cho and Lou do not expose the resist pattern to the mixture of gases, but do intend to etch the layer below the resist pattern by the mixture of gases. There is no reason to apply the etching condition e.g. gas flow rate of Lou to Cho's etching step because Cho and Lou teach etching of different materials.

Applicants respectfully submit that Lou does not provide a reason for the use of its etching gas in place of that used by Cho. As such, there is no reason whereby a skilled artisan would derive the claimed invention based on the teachings of Cho and Lou.

The Office Action maintains that Cho does not teach away from the use of oxygen in the gas mixture. See page 10, Section 8. E. of the Office Action. However, Cho states "In the first dry etch process 220, the SO_2 gas has a reactivity lower than that of the O_2 gas. The SO_2 gas has no lateral etching properties, and thereby generates polymer due to reaction with etch floating particles (column 3, lines 62-65)." O_2 gas has higher reactivity and lateral etching property. The subject matter of Cho's invention is to form polymer (210) shown in Fig. 3B. If O_2 were included in the gas mixture, the anti-reflective coating layer (207) would be laterally etched and the polymer (210) would not be formed. Otherwise, the result is a gas mixture which is directly

contrary to the intended operation of Cho's mixture. Therefore, Cho clearly teaches away from the use of oxygen in the gas mixture.

Wherefore, applicants respectfully submit that there is no basis for one of skill in the art to reach the currently claimed invention of parent claims 1, 10, 17 and 19, nor their dependent claims based upon the teachings of Cho and Lou. The references when interpreted as a whole do not provide one of skill in the art with a reason to make a combination resulting in the claimed invention,

Claims 7-8, and 15-16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho in view of Lou as applied to claims 1-2, 4-6, 9-12, 14, 17, 19, 21-22, above and further in view of U.S. Patent No. 6,187,688 (Ohkuni et al.).

Claims 23-26, are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho in view of Lou as applied to claims 1- 2, 4-6, 9-12, 14, 17, 19, 21-22, above and further in view of U. S. Patent Application Publication No. 200310134231 (Tsai et al.).

Applicants respectfully submit that by addressing the rejection of parent claims 1, 10 and 19 as detailed above, likewise the rejections of claims 7-8, 15-16 and 23-26 are addressed by nature of their dependency.

Claims 27-30, are rejected under 35 U.S.C. 102(e) as being unpatentable over Cho in view of U. S. Patent Application Publication No. 2002/0061654 (Kanegae et al., hereinafter referred to as Kanegae).

Applicants respectfully traverse on the basis that there is no reason whereby one of skill in the art would derive the claimed invention based on the combined teachings of Cho and Kanegae.

First, claims 27 and 28 both recite the gases used therein as the etching gas mixture. Second, in Cho' method, He is added to SO_2. In Kanegae's method, a rare gas, He, Ar, Ne, Kr, or Xe, is added to CF-based main etching gas (see paragraph [0168]). Adding the rare gas of Kanegae is intended to suppress dissociation of CF-based gas by controlling electron temperature and CF-based gas retention time. As is readily known to the skilled arisan, when the etching gases are different, rare gases added to the main etching gases have different actions. It would not be obvious to replace He gas of Cho with rare gases of Kanegae as the etch gases as there intended purposes are completely distinct from each other.

Further, claims 29 and 30 do not recite noble gases. As such, the features of these dependent claims is not recited in either of the cited references, nor is there any basis whereby one of skill in the art would use these gases in place of the recited gases of the prior art.

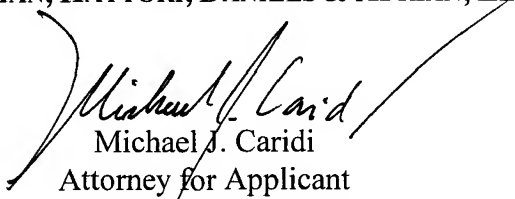
In view of the aforementioned amendments and accompanying remarks, Applicant submits that the claims, as herein amended, are in condition for allowance. Applicant requests such action at an early date. Further, applicants note that no substantive changes have been made to the claims. The claims have been amended only to place the application in condition for allowance.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



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